

5. Consequences for the choice of metrics in different applications

How do the characteristics of the application or tool determine the choice for human health metrics? Table V illustrated some of the differences between and within the medical applications and the environmental tools. How does this affect the choice of the metric, the elicitation method to derive preferences, the group for preference elicitation, time discounting, and the type of life tables to be used? Table VI summarizes our recommendations for the choices to be made according to Section 2 based on the characteristics summarized in Table V. The following arguments were used to come up with recommendations:

- *Life Tables*: The need for appropriate spatial and temporal coverage and the (im)possibility to identify subgroups with non-average mortality risks have been the guiding attributes to determine the appropriate life tables.
- *Whose values?*: Patients' preferences about their own disease are always important but may become impractical when a large number of different health outcomes need to be evaluated. In such cases, health care professionals may provide the necessary relative comparison. Depending on the degree of how socially binding the metric needs to be an additional representative panel may need to be formed (Nord 1999).
- *Time preference*: The level of individual versus societal decision making and the importance of intergenerational aspects were the guiding principles. The mentioned discount rates are illustrative for the range and do not imply that an exponential discount function needs to be chosen. It is also assumed that the future increase of value of HALYs and statistical life are considered. The zero discount rate for Life Cycle Assessment is based not only on the very long assessment horizon but also on present practice, where increase in future life expectancies are not considered.
- *Preferred elicitation method*: The main difference is here whether monetary or non-monetary values are derived. Further, the time trade-off (TTO) method with an adequate time horizon or the person trade-off method (PTO) with application compatible framing of the question have been judged to outperform other methods for the individual and societal application respectively, although the standard gamble often provides a more realistic description of the choice.
- *Level of measurement*: The better the social environment of the affected group is known the more these parameters should be included in the elicitation step (handicap level). If a large number of different social environments have to be covered or if future environments are unknown then a disability level is preferred.
- *Preferred metrics*: Both monetary and non-monetary metrics have flaws for valuation of both mortality and morbidity. However, since monetary methods require not only a health/health but a health/wealth tradeoff they are cognitively more demanding than non-monetary metrics. Therefore, we suggest using them only when monetary units are desirable¹ as a measurement unit. "HALYs+" stands for Health Adjusted Life Years with age weighting. We use this notion

¹ "Desirable" stands for decisions where trade-offs between human health and monetary expenditures are at stake.

because the column headings above specify most of the specific features that would differentiate between QALYs and DALYs and because the age weighting to be used deviates from the standard procedure in the DALYs framework. For environmental applications, we also suggest to supplement the HALYs+ with cost of illness. HYE are not considered preferable because empirical experience and data are lacking. However, this metric may well be developed for environmental applications where the number of relevant health outcomes is limited.

- *Marginal/average and distributional aspects:* If we are interested in the analysis of changes due to an intervention compared to a reference situation, e.g., present situation, then we call this a marginal analysis (where all other risk factors are kept constant). If the distributional aspects will play a major role in the decision making, we suggest to calculate the health metric scores for all relevant sub-groups and to add a semi-quantitative discussion.

We are aware that the recommendations in Table VI may be challenged in specific applications for arguments that could not be captured on this generic level. We also expect major developments in the areas of WTP that may alter our assessment within the coming years. Finally, we will list some strengths and weaknesses of the suggested metrics in the concluding Section 6.

Tab. VI: Recommendations for the choice of human health metrics and their specific assumptions.

| Applications: | Life Table to calculate YLL | Whose values | Time preference (discount rate) | Preferred elicitation method | Level of measurement | Preferred metrics | Remarks |
|--|--|--|---|--|------------------------------|--|---|
| Medical decision support | | | | | | | |
| Clinical decision support for single patient | Clinical estimate based on diagnosis | Patient | Individual (rates vary from -x% to plus 100%) | TTO, transformed VAS, decomposed | Handicap | Non-monetary | Marginal analysis |
| Technology/product assessment for pharmaceutical companies and health care providers | Disease group-specific, future-oriented | Patients or health care professionals | Market (1-10%) | TTO CV, revealed preferences, attribute-based stated choice | Combined disability/handicap | HALYs+ or WTP | Marginal analysis |
| Tool for resource allocation of health insurance or national health planning plan | Regional/national life tables, present or future | Patients or combined patients/societal values | Market/societal (1-10%) | PTO | Combined disability/handicap | HALYs+ | Distributional aspects important, mostly marginal analysis |
| Global health monitoring and resource allocation (Global Burden of Disease) | Universal life table for monitoring, Future-oriented regional/national life tables for resource allocation | Health care professionals or large sample of combined patients/societal values | Societal (1-5%) | PTO | Disability | HALYs+ | Average analysis for monitoring, distributional aspects and marginal analysis important for resource allocation |
| Environmental decision support tools: | | | | | | | |
| Micro-tools: Life Cycle Assessment | Future-oriented regional life tables | Health care professionals or large sample of combined patients/societal values | None (0%) | PTO | Disability | HALYs+ | Marginal analysis |
| Meso-tools: (Comparative) Risk Assessment for Technology Assessments | Group/area-specific (all levels possible) | Depends on context | Societal (1-5% or different for longterm) | Depends on context | Combined disability/handicap | HALYs+ plus COI, WTP plus collectively borne costs | Distributional aspects important, marginal analysis |
| Macro-tools: (Comparative) Risk Assessment for regulation | Present/future national life tables | Patients or combined patients/societal values | Societal (1-5%) | PTO, CV, revealed preferences, attribute-based stated choice | Combined disability/handicap | HALYs+ plus COI, WTP plus collectively borne costs | Distributional aspects important |
| Macro-tools: Cost-Benefit Assessment for regulation | Present/future national life tables | Patients or combined patients/societal values | Societal (1-5%) | CV, revealed preferences, attribute-based stated choice | Combined disability/handicap | WTP plus collectively borne costs | Distributional aspects important, marginal analysis |